Baumann™ 51000 Low Flow Control Valve

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Figure 1. 51000 NPS 1/2 Control Valve with Baumann 16 Actuator, and FIELDVUE™ DVC2000 Digital Valve Controller

W9066

Introduction

The Baumann 51000 control valve (figure 1) is optimally designed for demanding low flow control and is a perfect fit where space is at a premium. This compact package provides the connection integrity of flanged body globe valves, while being significantly lighter and easier to install.

Scope of Manual

This instruction manual includes installation, maintenance, and parts information for the 51000 control valve and Baumann 16 actuator.

Do not install, operate, or maintain Baumann 51000 control valves without being fully trained and qualified in valve, actuator, and accessory installation, operation, and maintenance. **To avoid personal injury or property damage, it is important to carefully read, understand, and follow all the contents of this manual, including all safety cautions and warnings.** If you have any questions about these instructions, contact your Emerson Process Management sales office before proceeding.

⚠ WARNING

Always wear protective gloves, clothing and eyewear when performing any installation operations to avoid personal injury.

Personal injury or property damage caused by sudden release of pressure or bursting of pressure retaining parts may result if service conditions exceed those for which the product was intended. To avoid injury or damage, provide a relief valve for over pressure protection as required by government or accepted industry codes and good engineering practices.

Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

If installing into an existing application, also refer to the WARNING at the beginning of the Maintenance section in this instruction manual.

CAUTION

This valve is intended for a specific range of pressures, temperatures and other application specifications. Applying different pressures and temperatures to the valve could result in parts damage, malfunction of the control valve or loss of control of the process. Do not expose this product to service conditions or variables other than those for which the product was intended. If you are not sure what these conditions are you should contact your Emerson Process Management sales office for more complete specifications. Provide the product serial numbers (shown on the nameplate) and all other pertinent information.

⚠ WARNING

Personal injury could result from packing leakage. Valve packing is tightened before shipment; however, the packing might require some readjustment to meet specific service conditions.

Educational Services

For information on available courses for Baumann 51000 valves, as well as a variety of other products, contact:

Emerson Process Management
Educational Services - Registration
Phone: 1-641-754-3771 or 1-800-338-8158
E-mail: education@emerson.com
http://www.emersonprocess.com/education

Maintenance

⚠ WARNING

Avoid personal injury and property damage from sudden release of process pressure or bursting of parts. Before performing any maintenance operations:

- **Do not remove the actuator from the valve while the valve is still pressurized.**
- **Always wear protective gloves, clothing, and eyewear when performing any maintenance operations.**
- **Disconnect any operating lines providing air pressure, electric power, or a control signal to the actuator. Be sure the actuator cannot suddenly open or close the valve.**
- **Use bypass valves or completely shut off the process to isolate the valve from process pressure. Relieve process pressure on both sides of the valve. Drain the process media from both sides of the valve.**
- **Depending on the actuator construction, it will be necessary to manage the pneumatic actuator spring pre-compression. It is essential to refer to the relevant actuator instructions in this manual to perform safe removal of the actuator from the valve.**
- **Use lock-out procedures to be sure the above measures stay in effect while you work on the equipment.**
- **The valve packing box may contain process fluids that are pressurized, *even when the valve has been removed from the pipeline.* Process fluids may spray out under pressure when removing the packing hardware or packing rings, or when loosening the packing box pipe plug.**
- **Check with your process or safety engineer for any additional measures that must be taken to protect against process media.**

Note

Whenever a gasket seal is disturbed by removing or shifting gasketed parts, install a new gasket during reassembly. This provides a good gasket seal because the used gasket may not seal properly.

⚠ WARNING

Avoid personal injury or property damage by thoroughly cleaning the line of all dirt, welding chips, scale, oil or grease, and other foreign material. Failure to do so could result in damage to the seating and sealing surfaces of the valve and result in damage to the valve and release of process materials.

Installation

1. Before installing the valve in the pipeline, thoroughly clean the line of all dirt, welding chips, scale, oil or grease, and other foreign material.
2. Install the valve so the controlled fluid will flow through the valve body in the direction indicated by the arrow.
3. A three-valve bypass permits removal of the control valve from the line without shutting down the system.
4. In case of a heat-insulated installation, insulate the valve body only, not the bonnet.

Actuator Removal

Refer to figures 2, 3, 7, and 8.

1. For air to open actuators, lift actuator travel with air to lessen tension on the upper clamp nut (key 10).

Note

For air-to-close, this is NOT required

2. Gently tap the upper clamp nut (key 10). With slight downward pressure on top of the actuator, unscrew the upper clamp nut (key 10) completely.
3. The Baumann 16 actuator assembly must be unscrewed from the stem adapter (key 26).

Plug and Packing Replacement

Refer to figures 2 and 3.

CAUTION

When adjusting the valve stem, do not grip the stem directly with pliers or a wrench. This will damage the surface of the stem, and cause damage to the packing in the valve.

1. For valves supplied with Baumann 16 actuators, remove the travel indicator disc (key 58). With the hex jam nuts (key 27) still tight, loosen the stem adapter (key 26) from the stem adapter nut (key 31), and unthread the stem adapter (key 26) from the plug stem (key 4).

For valves with rated Cv's less than 1.0, unscrew the packing nut (key 11) and gently pull the plug (key 4) out through the top of the bonnet (key 6).

For valves with rated Cv's greater than or equal to 1.0, follow the VALVE DISASSEMBLY instructions to first remove the bonnet (key 6) before removing the plug (key 4).

2. Inspect or replace the packing (key 9) and the stem guide (key 8).
3. Inspect the valve plug (key 4) for wear or particle accumulation.

Valve Disassembly

Refer to figures 2 and 3.

Note

The actuator must be removed from the valve body before valve body disassembly.

The valve packing box may contain process fluids that are pressurized, even when the valve has been removed from the pipeline. Process fluids may spray out under pressure when removing the packing hardware or packing rings, or when loosening the packing box pipe plug.

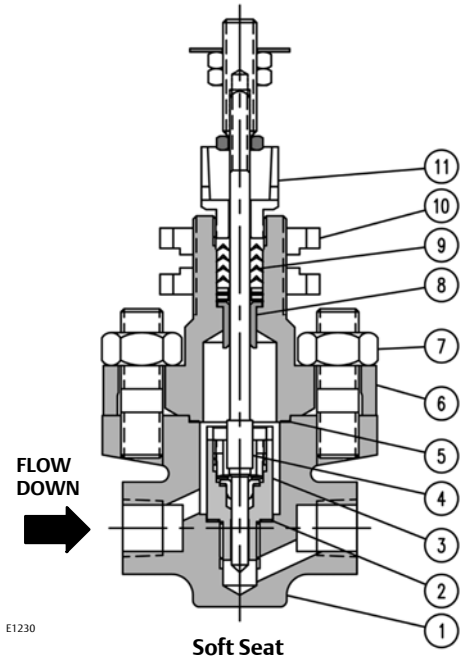
1. Remove the bonnet hex nuts (key 7) and lift the bonnet (key 6) off the valve body (key 1), which may include the packing (key 9) and plug assembly (key 4) [For alloy valve bodies, lift the bonnet flange (key 34) off from the bonnet (key 6) and then lift the bonnet (key 6) off the valve body (key 1)].
2. Remove the bonnet gasket (key 5) and replace.
3. The cage subassembly (key 3) can be removed by unscrewing with a flat screwdriver, using the outer screw slot, and lifting out of the valve body (key 1). The cage subassembly should be inspected and cleaned with water or an approved solvent.

For valves with rated Cv's greater than or equal to 1.0, remove and inspect the plug guide (key 33) for wear. Replace if necessary. Replacement of the entire assembly will be necessary if excessive leakage or wear has occurred in service.

Note

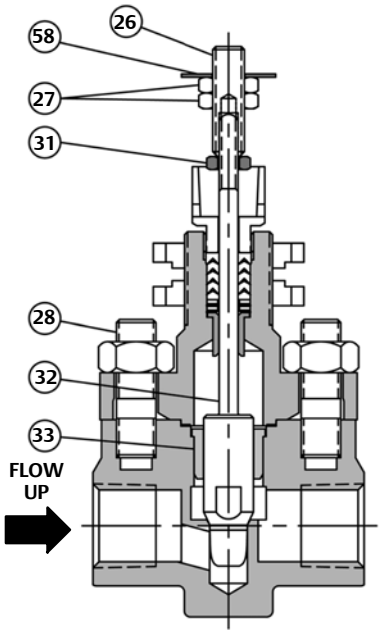
The seat cage gasket (key 2) must be replaced when the cage subassembly (key 3) has been removed. The seat cage will appear oblong. This is to prevent loosening of the soft seat.

Figure 2. Baumann 51000 Valve Body Subassembly, NPS 1/4 Soft Seat



Soft Seat

Figure 3. Baumann 51000 Valve Body Subassembly, NPS 1/2 Alloy Valve Body Integral (Metal) Seat



Metal Seat

Valve Reassembly

1. Place the cage gasket (key 2) and cage subassembly (key 3) in the valve body (key 1).
2. Tighten the cage (key 3) hand tight plus 1/8 of a turn [For valves with rated Cv's greater than or equal to 1.0, insert the plug guide (key 33)].
3. Place the seat plug (key 4) into the valve body (key 1).
4. Place the bonnet gasket (key 5) into the valve body (key 1). Look at the bonnet (key 6) and valve body (key 1) for correct bonnet orientation.
5. Place the bonnet (key 6) onto the valve body (key 1) and secure with the hex nuts (key 7). For alloy valve bodies, place the bonnet (key 6) onto the valve body (key 1), then place the bonnet flange (key 34) over the bonnet - confirm correct orientation - then secure with the hex nuts (key 7).
   DO NOT TIGHTEN AT THIS POINT.
6. Install the stem guide (key 8) and packing kit (key 9) on the plug stem (key 4) in the proper order (as shown in figure 4).
7. Carefully press into the top of the bonnet (key 6) making sure each part is seated properly.

8. Install packing rings over the stem one at a time. Use the packing follower nut (key 11) to push each packing ring in individually to avoid jamming.
9. With all required packing (key 9) in place, tighten the packing follower nut (key 11) until it becomes stiff. DO NOT OVERTIGHTEN THE PACKING FOLLOWER (key 11).
10. Now tighten the hex nuts (key 7).

Figure 4. V-Ring Packing Kit

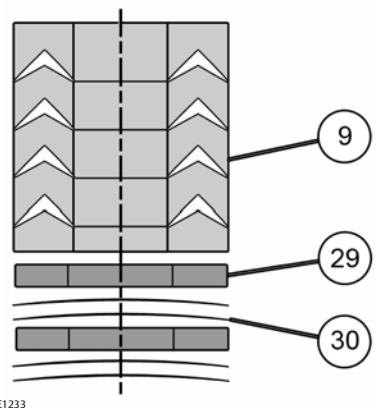


Table 1. Baumann 51000 V-Ring Packing Kit 51607

KEY NO.	QTY	DESCRIPTION	PART NUMBER	
			S31600 Valve Body	N10276 Nickel Alloy Valve Body
9(1)	1	Packing Set	51604	
29	2	Flat Washer	51606	---
30	4	Disc Spring	51605	---

1. P/N 51604 used by itself for N10276 Nickel Alloy Packing.

Parts Ordering

When corresponding with your Emerson Process Management sales office about this equipment, always mention the valve serial number. When ordering replacement parts, also specify the key number, part name, and desired material using the following parts tables.

⚠ WARNING

Use only genuine Fisher® replacement parts. Components that are not supplied by Emerson Process Management should not, under any circumstances, be used in any Fisher valve, because they may void your warranty, might adversely affect the performance of the valve, and could cause personal injury and property damage.

Figure 5. Baumann 16 Actuator

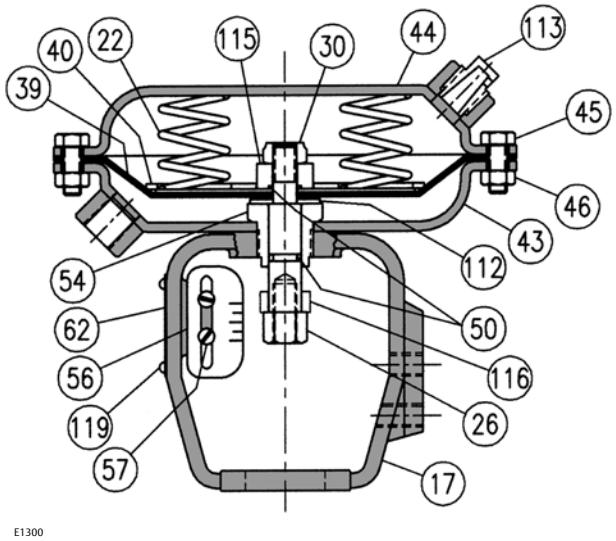


Table 2. Baumann 16 Actuator Part Numbers

Key No.	Qty	Description	Part Number
17	1	Yoke - Machined	81811
22	5	Spring 1/2 inch Stroke 4-15 psi	81860
	4	Spring 1/2 inch Stroke 3-12 psi	81860
26	1	Actuator Stem	81840
30	1	Hex FLEXLOC Nut	81844
39*	1	Diaphragm	011759-001-686
40	1	Diaphragm Plate	81850-1
43	1	Lower Actuator Case	81820
44	1	Upper Actuator Case	81823
45	8	Hex Head Cap Screw	81824
46	8	Hex Nut	81825
50*	2	O-Ring, FKM (Fluorocarbon)	24080
54	1	Coupling	81830
56	1	Travel Scale	983674-001-250
57	2	Pan Head Machine Screw	81812
62	1	Serial Plate	81891
112	1	Washer	25861-24
113	1	Vent Plug	24147
115	1	Collar	81870
116	1	Collar, Upper Stop (Not shown)	81842
119	2	Drive Screw	24686

* Recommended spare parts.

Table 3. Valve Body Assembly Part Numbers

KEY NO.	DESCRIPTION	QTY	PART NUMBER					
			NPS 1/4 SST	NPS 1/4 N10276 Nickel Alloy	NPS 1/2 SST Integral Seat	NPS 1/2 N10276 Nickel Alloy Integral Seat	NPS 1/2 SST Screwed Seat	NPS 1/2 N10276 Nickel Alloy Screwed Seat
1	Valve Body	1	51102	51125	51114	51127	51112	51126
2*	Seat Cage Gasket	1	51710		---		51710	
3*	Soft Seat Cage Subassembly	1	51201T001	51201T002	---		51201T001	51201T002
4*	Plug	1	Refer to table 4					
5*	Bonnet Gasket	1	51715		51715		51715	
6	Bonnet	1	51302	51303	51302	51303	51302	51303
7	Hex Nut	2	25705M		25705M		25705M	
8	Stem Guide	1	51601	51608	51601	51608	51601	51608
9*	V-Ring	1	---	51604	---	51604	---	51604
	V-Ring Packing Kit	1	51607	---	51607	---	51607	---
10	Clamp Nut	2	51815		51815		51815	
11	Packing Follower Nut	1	51602	51602-1	51602	51602-1	51602	51602-1
28	Stud	2	51703		51703		51703	
32	Plug & Stem S/A	1	---		Refer to table 4			
33	Plug Guide	1	---		51206	51206-1	---	
34	Flange, Bonnet	1	---	51304	---	51304	---	51304
26	Stem Adapter		Baumann 16 Actuator Mounting Kit Part Number MTG51T16					
27	Hex Jam Nut							
31	Stem Adapter Jam Nut							
58	Travel Indicator Disc							

Table 4. Baumann 51000 Plug Selection

Key No.	Valve Size	Plug Cv	Part Number ASTM A479 S21800 Annealed	Part Number N10276 NICKEL Alloy	Marking Code
4	NPS 1/2 ONLY	2.5	51425-411-999	51425-1-411-999	T01
		1.5	51415-411-999	51415-1-411-999	T02
		1.0	51410-411-999	51410-1-411-999	T03
	NPS 1/4 & 1/2	0.45	51402-4	51402-4-1	T04
		0.2	51402-3	51402-3-1	T05
		0.1	51401-12	51402-2-1	T06
		0.06	51401-11	51041-11-1	T07
		0.03	51401-10	51401-10-1	T08
		0.015	51401-9	51401-9-1	T09
		0.008	51401-8	51401-8-1	T10
		0.004	51401-7	51401-7-1	T11
		0.002	51401-6	51401-6-1	T12
		0.001	51401-5	51401-5-1	T13
		0.0005	51401-4	51401-4-1	T14
		0.00025	51401-3	51401-3-1	T15
		0.00013	51401-2	51401-2-1	T16
Linear		0.5	51402-5	51402-5-1	T17

Figure 6. Dimensions

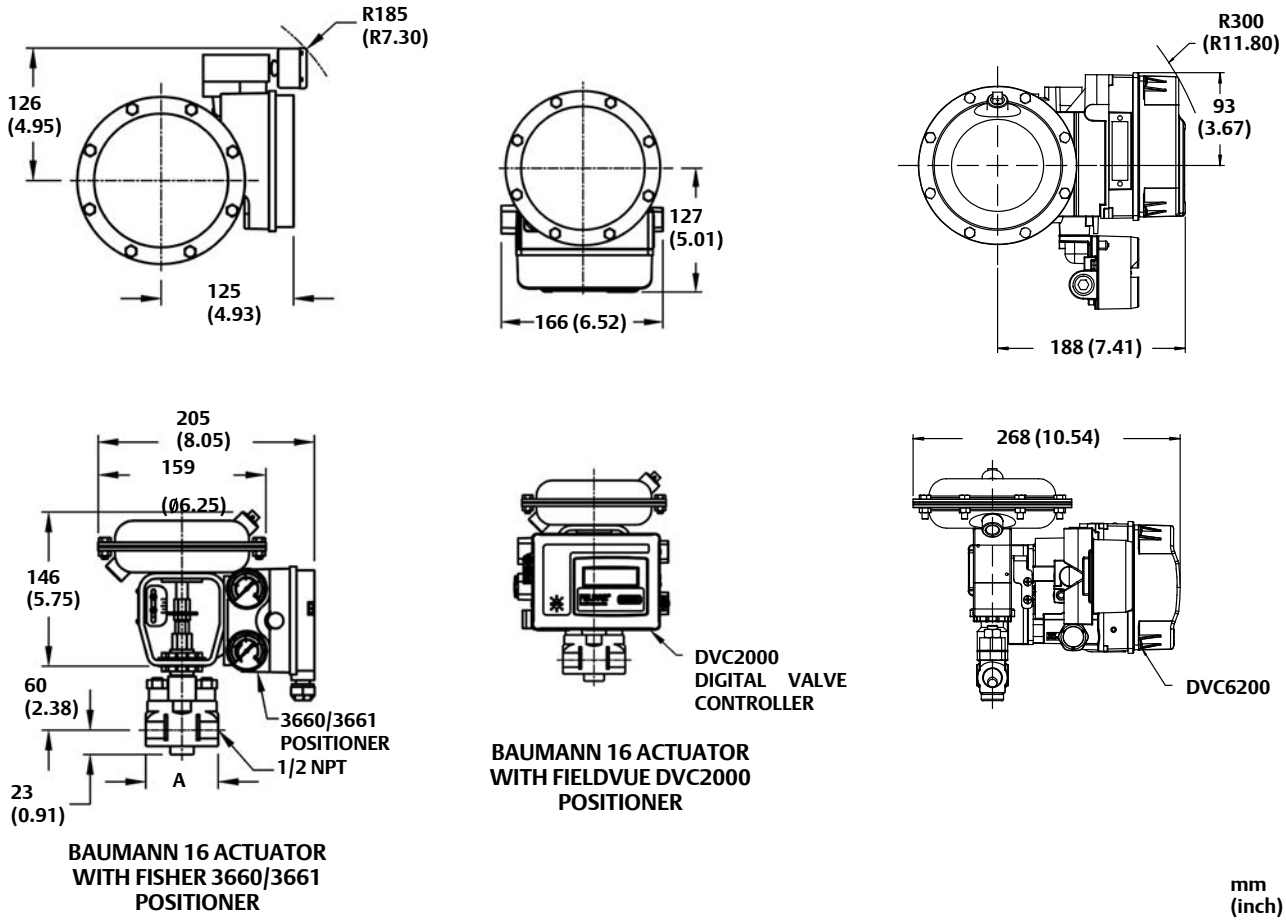


Table 5. Dimensions and Weights, Valve Body Subassembly

VALVE SIZE		A		MATERIAL	APPROXIMATE WEIGHTS	
mm	NPS	mm	Inch		kg	lbs
6.35	1/4	55.9	2.20	Stainless Steel	0.64	1.4
				N10276 Nickel Alloy	1.0	2.2
12.7	1/2	68.6	2.70	Stainless Steel	0.82	1.8
				N10276 Nickel Alloy	1.18	2.6

Figure 7. Baumann 16 Actuator (Front View)

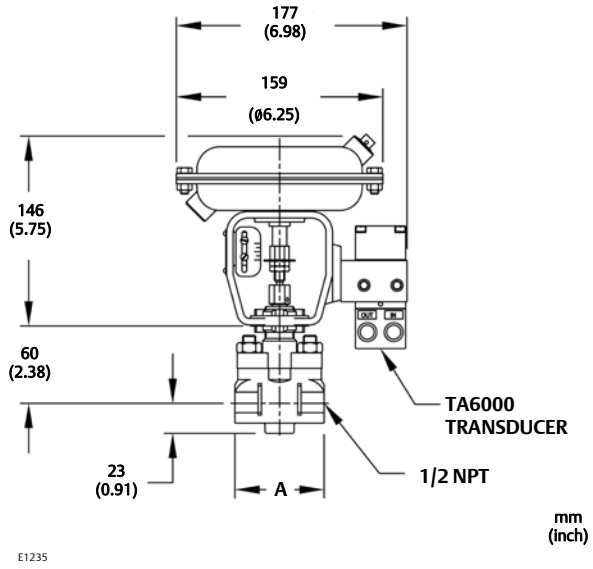


Figure 8. Baumann 16 Actuator with TA6000 (Top View)

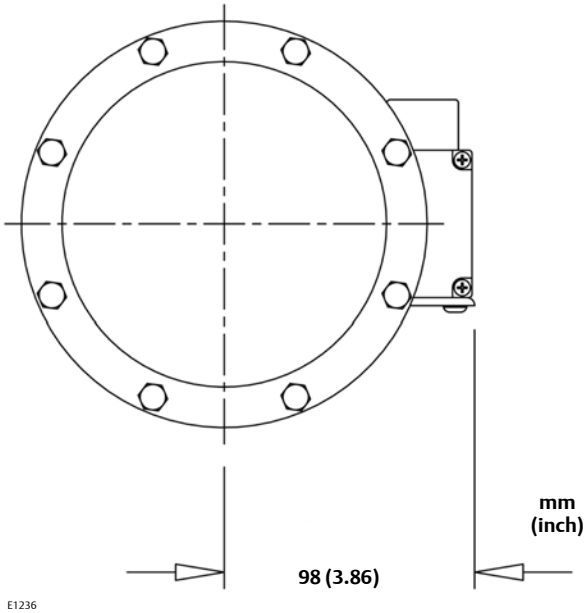


Table 6. Actuator/Instrument Weights

ACTUATOR	INSTRUMENT	APPROXIMATE WEIGHT	
		kg	lbs
16	Actuator without instrument	2.1	4.6
	Fisher 3660/3661 Positioner	3.6	8.0
	FIELDVUE DVC2000	3.8	8.3
	FIELDVUE DVC6200 and DVC6200f (Aluminum)	3.5	7.7
	FIELDVUE DVC6200 and DVC6200f (SST)	8.6	19
	TA6000 Electropneumatic Transducer	2.5	5.5

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